OIPE JC10 DEC 05 2003 PATENT & TRADEMARK OFFICE

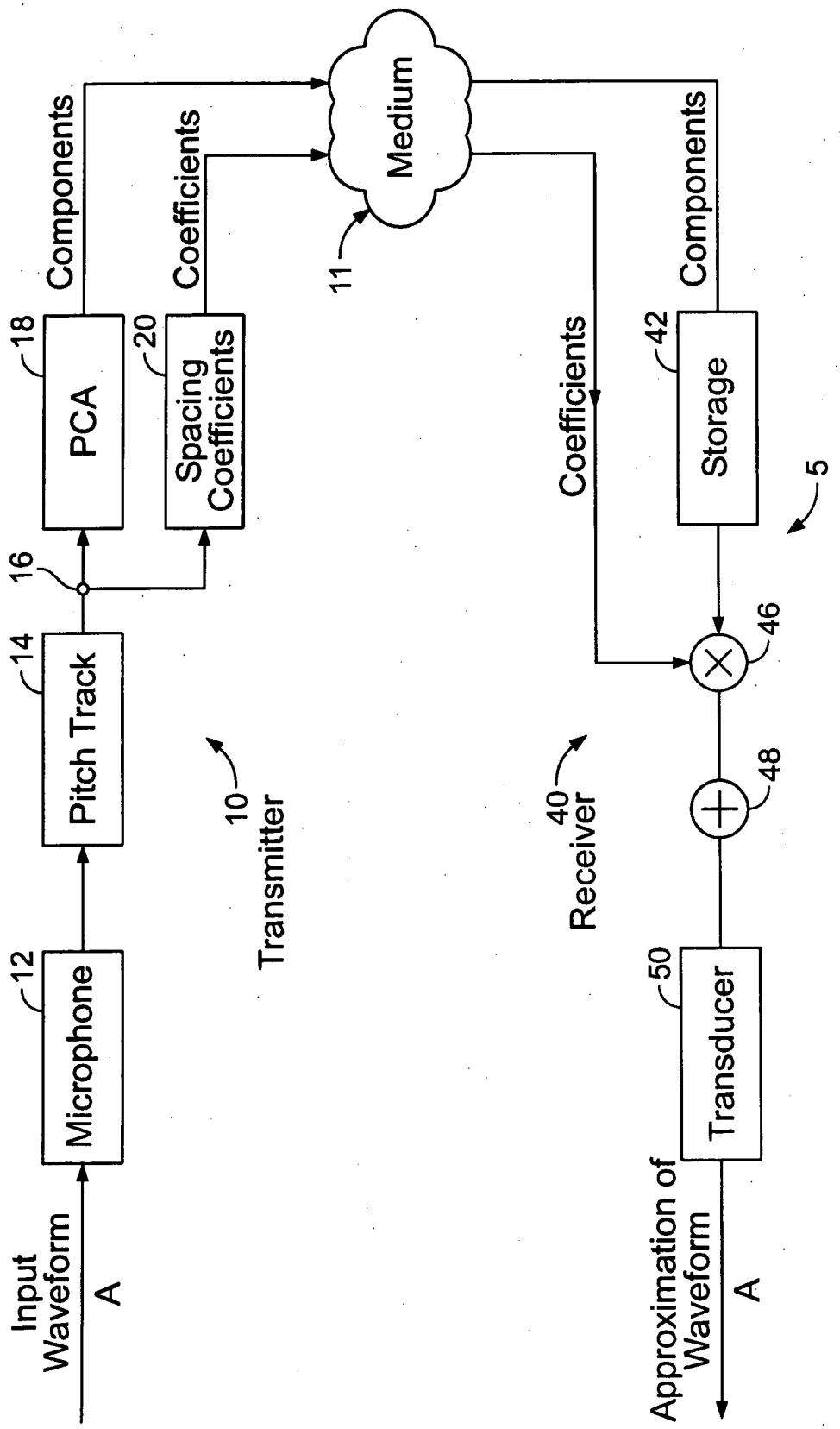

FIG. 1

OIPE JC10 30 DEC 05 2003 PATENT & TRADEMARK OFFICE

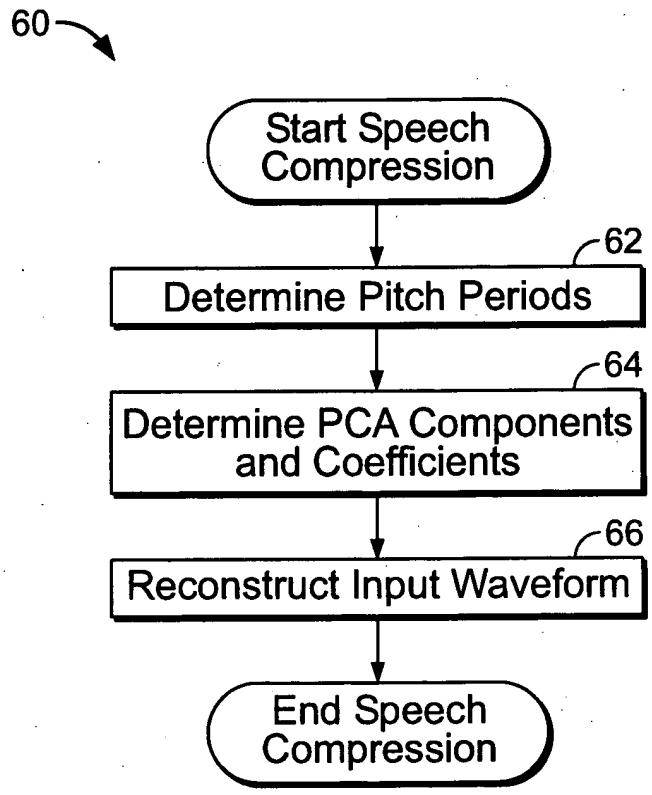

FIG. 2

OIPE JC10 DEC 05 2003 PATENT & TRADEMARK OFFICE

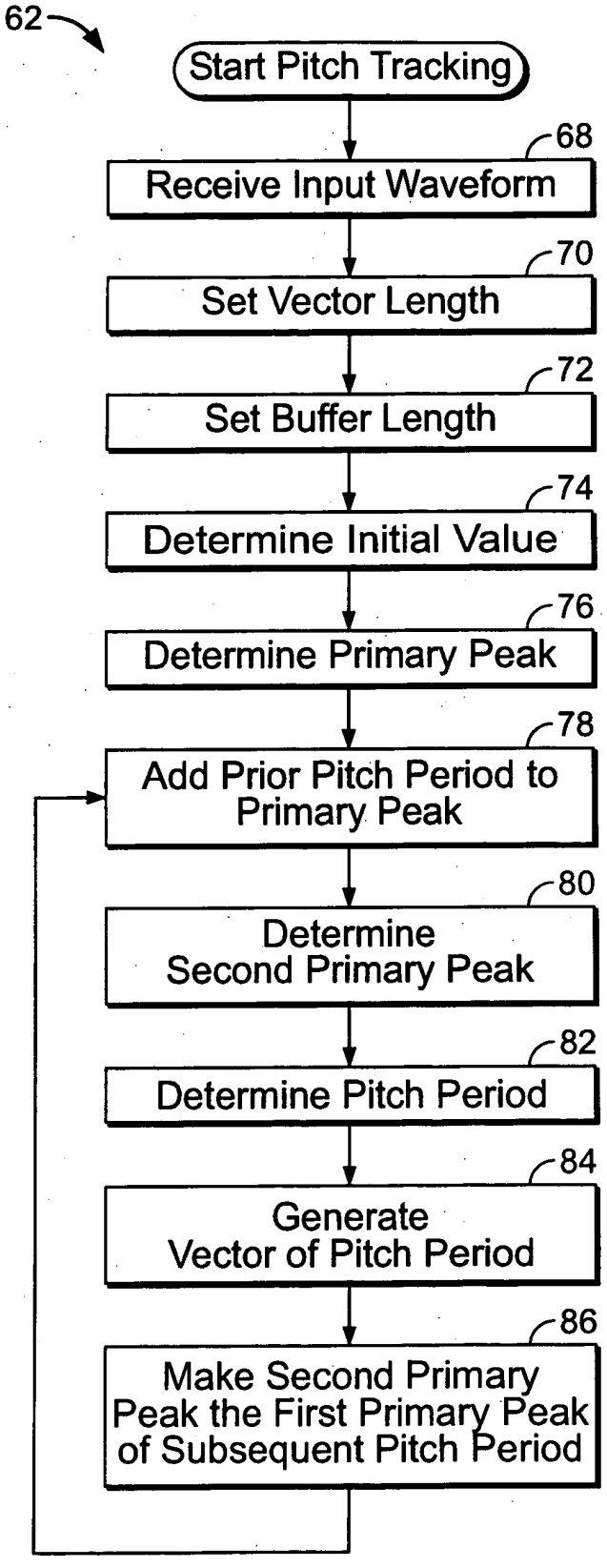

FIG. 3

OIPE JC10 DEC 05 2003 PATENT & TRADEMARK OFFICE

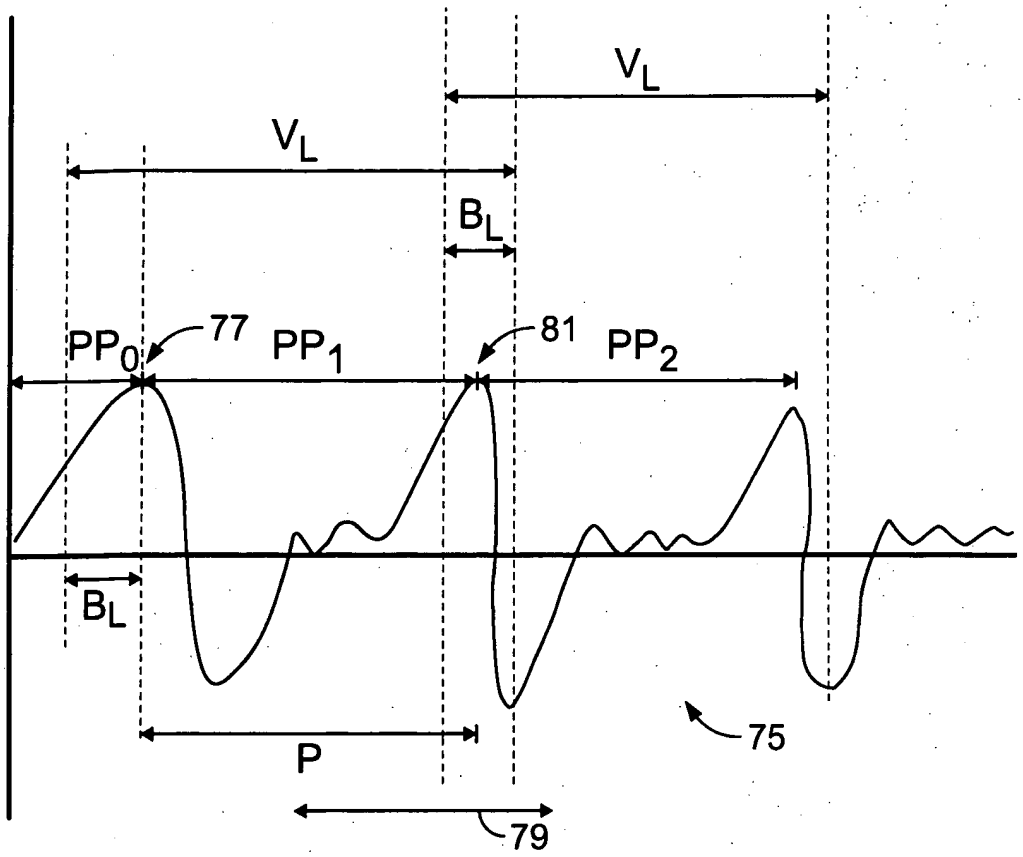

FIG. 4

O I P E JC10 DEC 05 2003 PATENT & TRADEMARK OFFICE

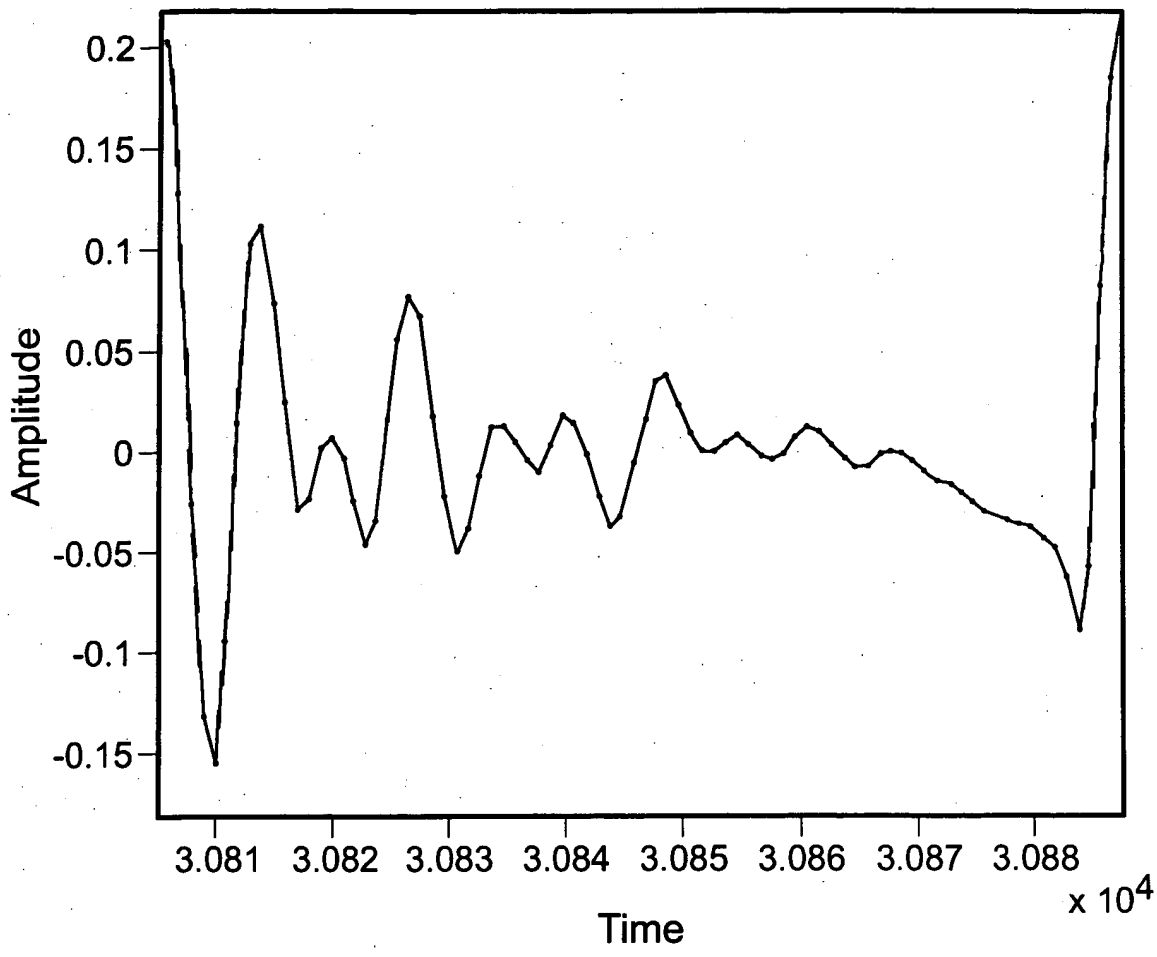

FIG. 5

OIPE JC10 DEC 05 2003 PATENT & TRADEMARK OFFICE

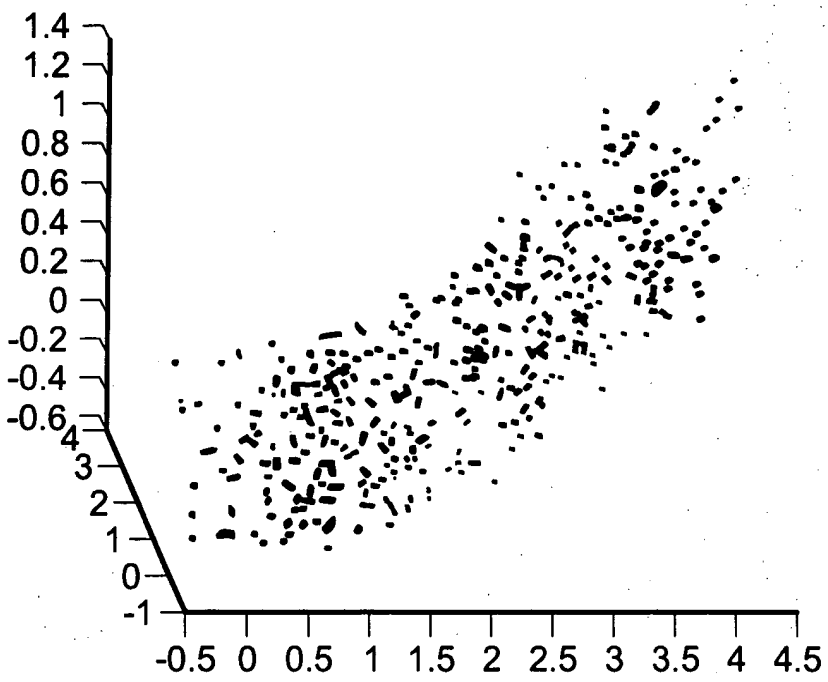

FIG. 6A

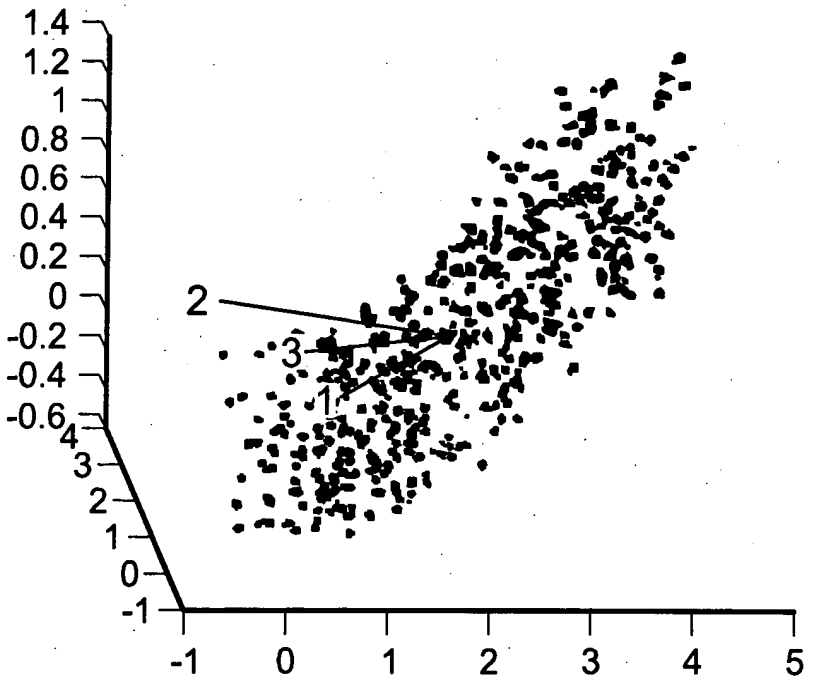
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
4
3
2
1
0
-1
-1 0 1 2 3 4 5
2
3
1

FIG. 6B

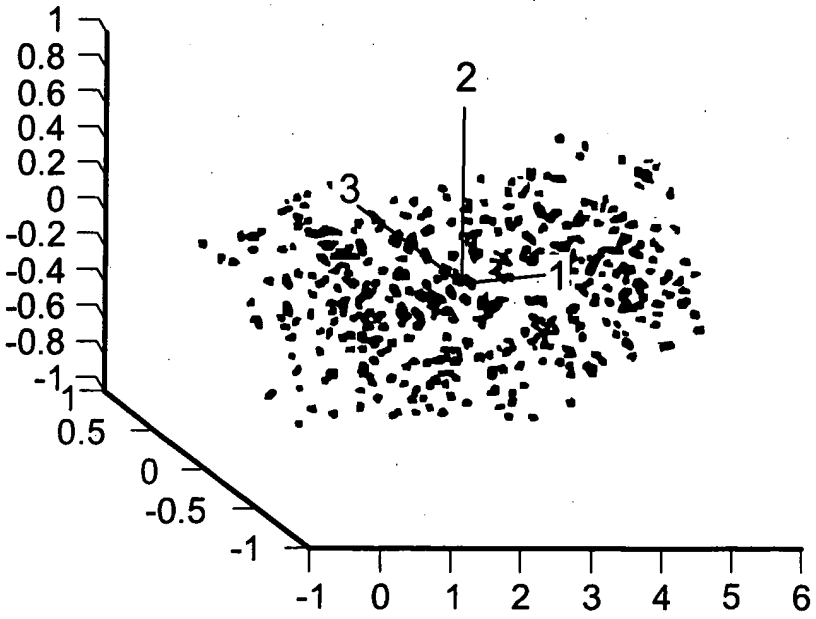
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
1
0.5
0
-0.5
-1
-1 0 1 2 3 4 5 6
2
3
1

FIG. 6C

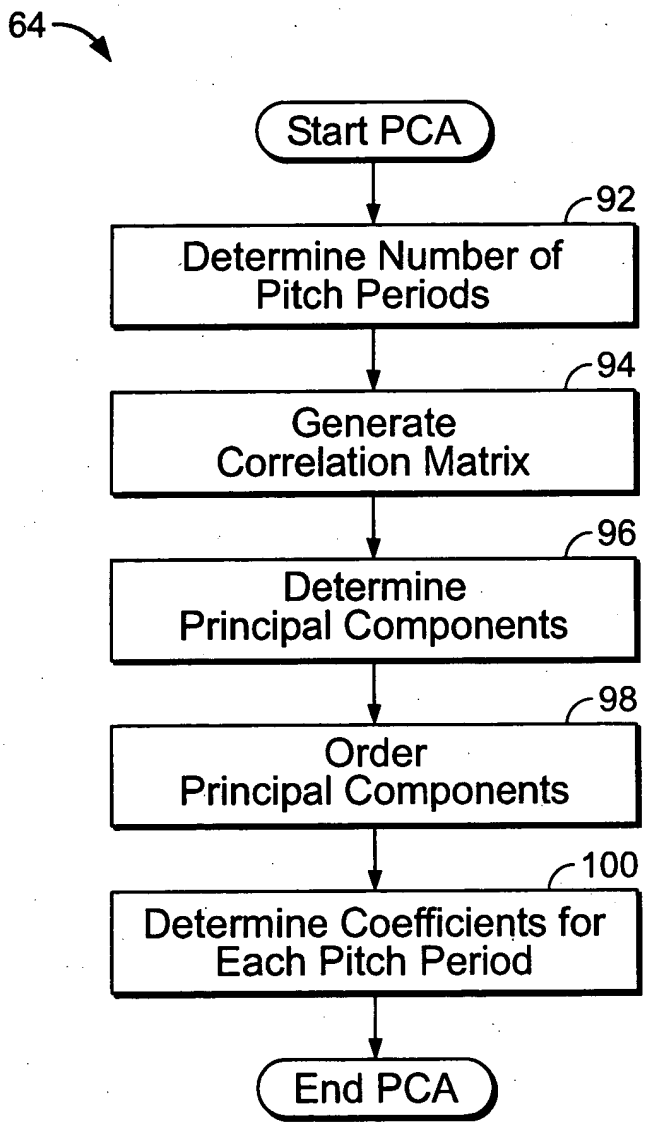
64
Start PCA
92
Determine Number of Pitch Periods
94
Generate Correlation Matrix
96
Determine Principal Components
98
Order Principal Components
100
Determine Coefficients for Each Pitch Period
End PCA

FIG. 7

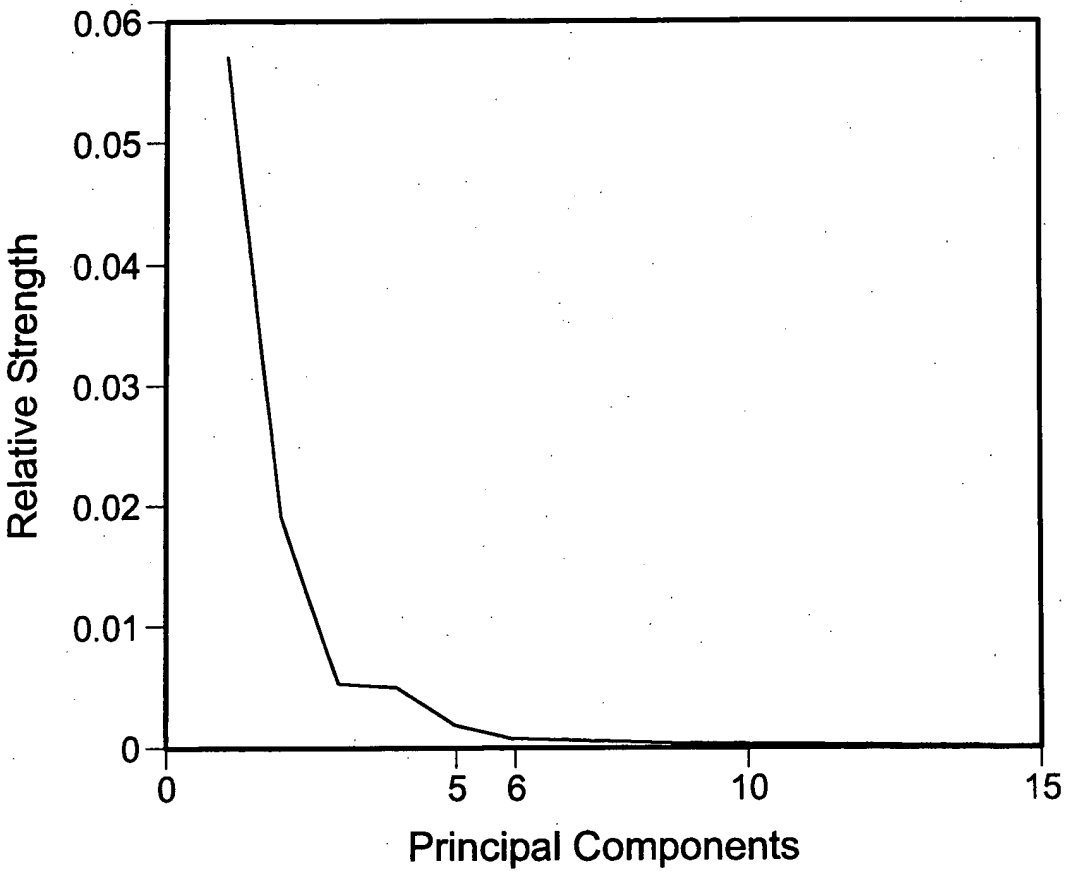
0.06
0.05
0.04
0.03
0.02
0.01
0
Relative Strength
0
5
6
10
15
Principal Components

FIG. 8

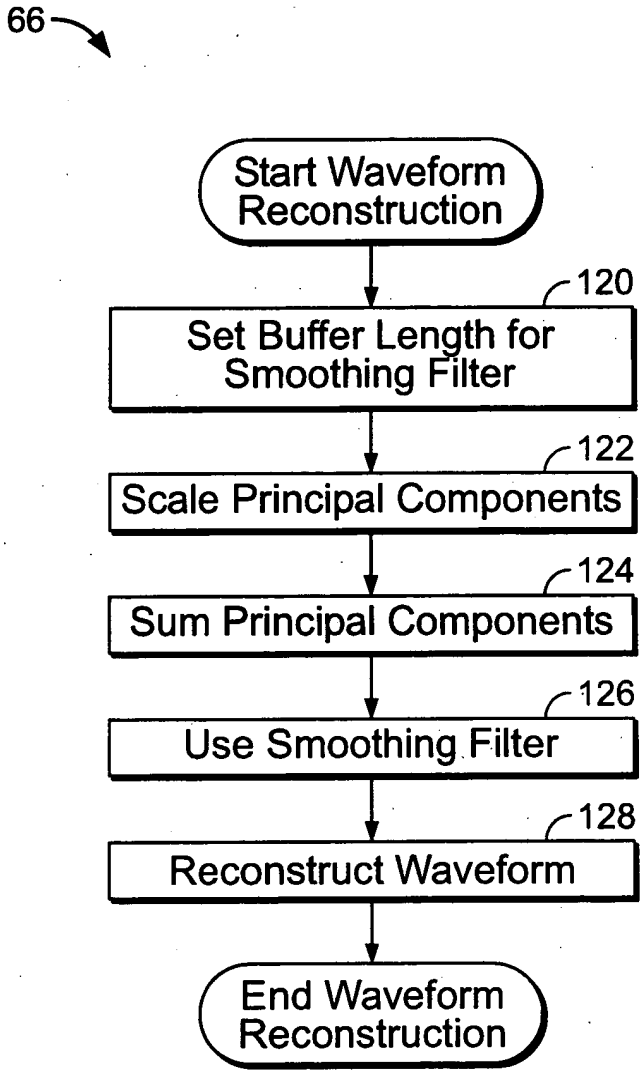
66
Start Waveform Reconstruction
120
Set Buffer Length for Smoothing Filter
122
Scale Principal Components
124
Sum Principal Components
126
Use Smoothing Filter
128
Reconstruct Waveform
End Waveform Reconstruction

FIG. 9

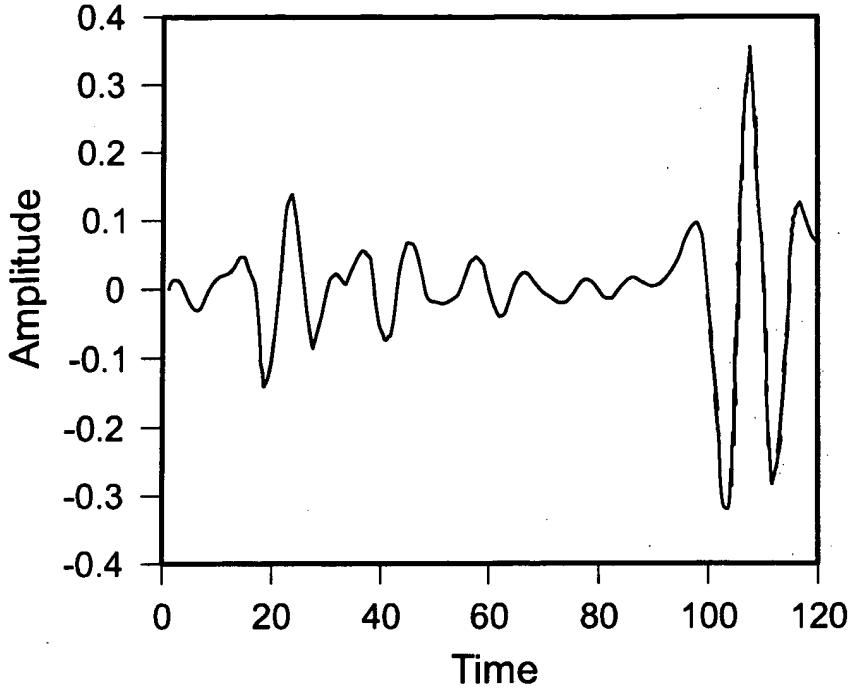

FIG. 10A

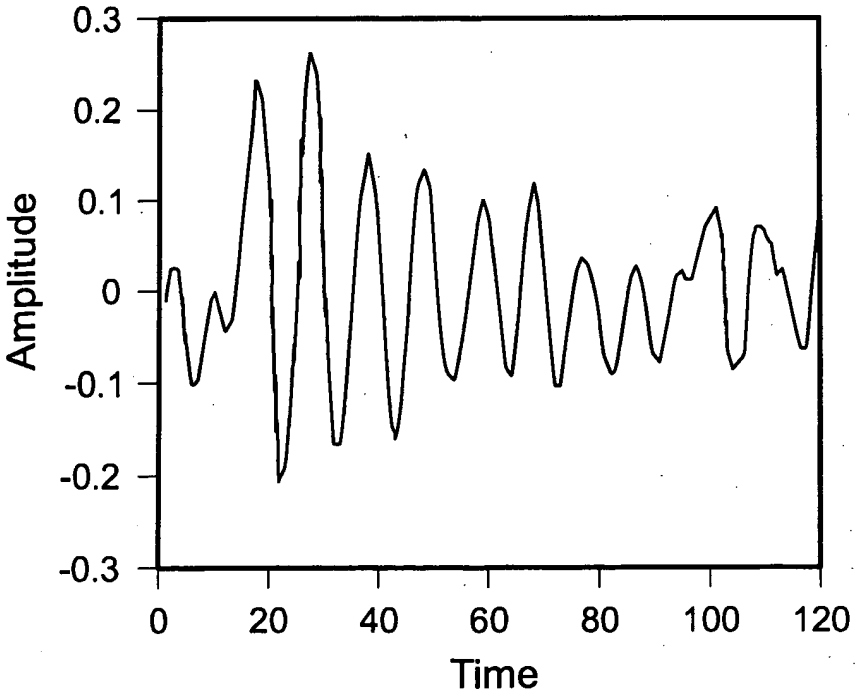

FIG. 10B

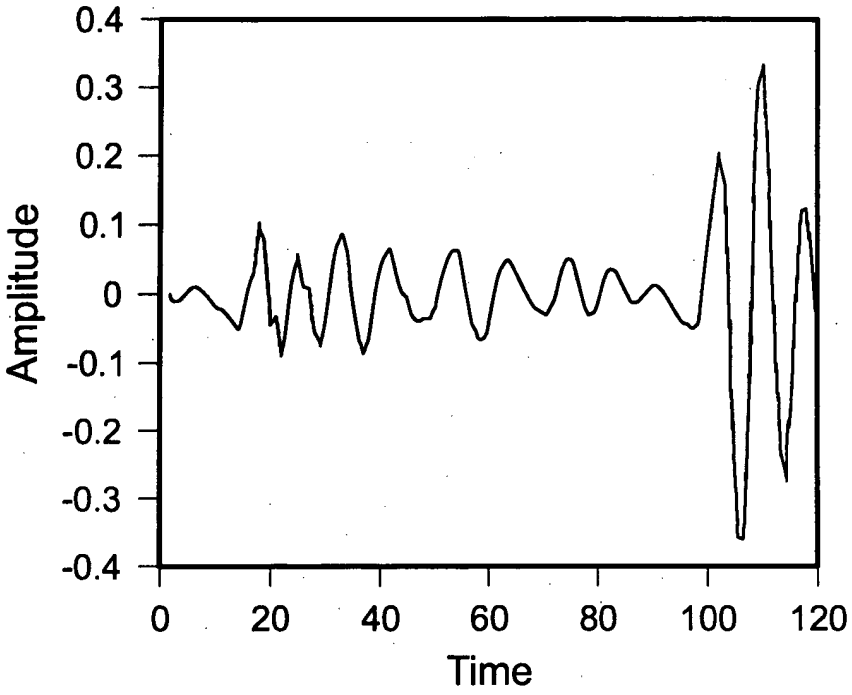

FIG. 10C

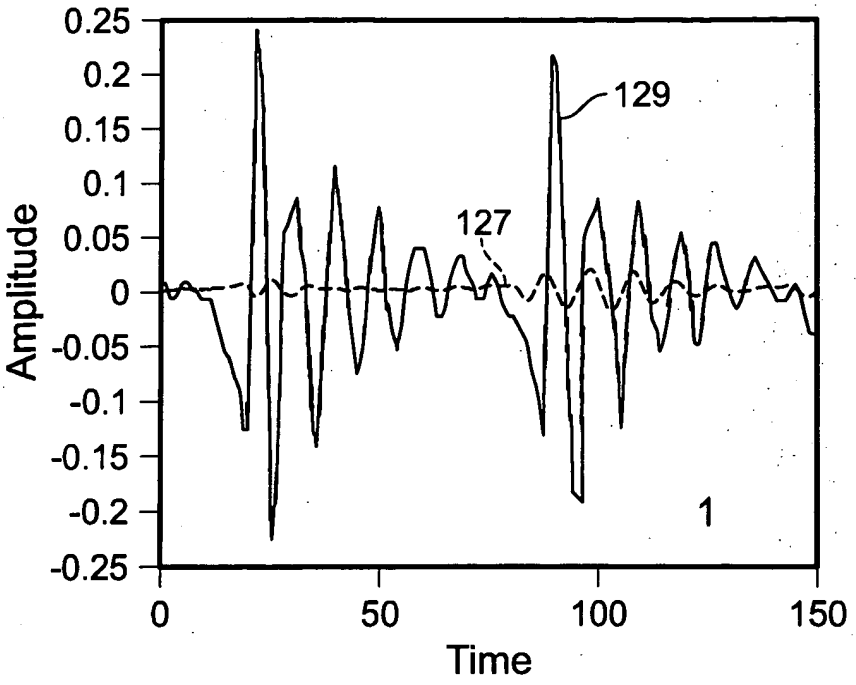

FIG. 11A

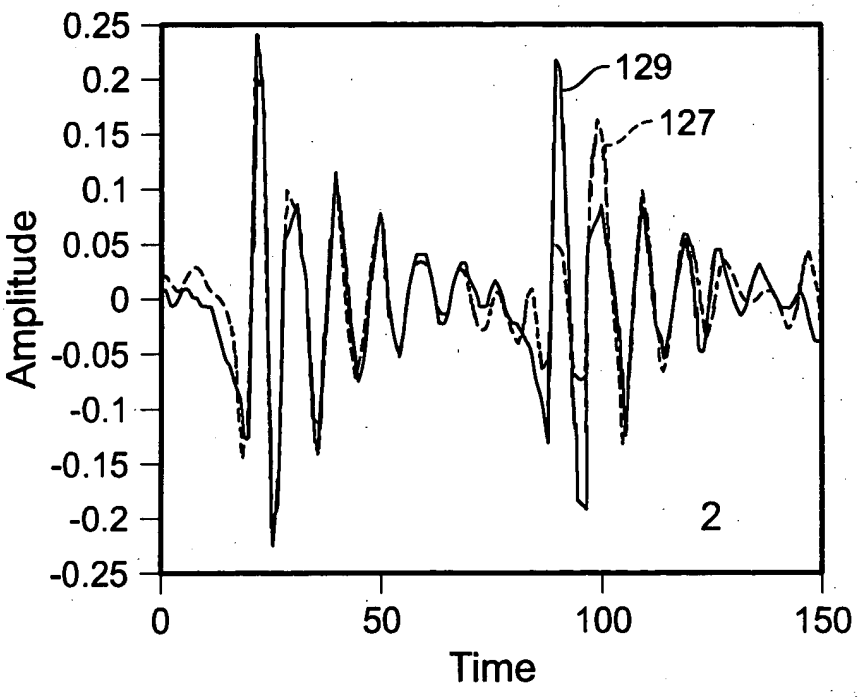

FIG. 11B

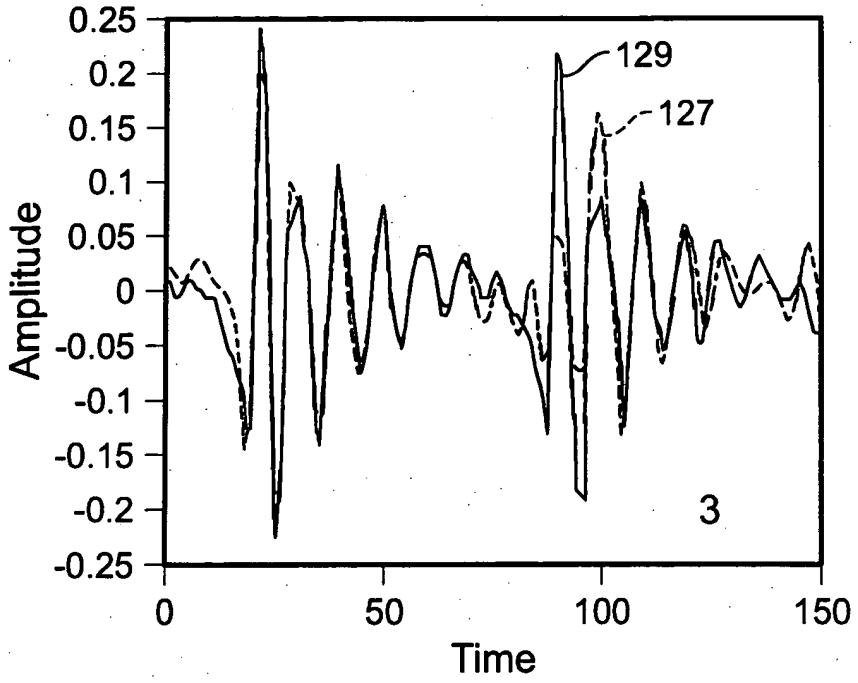

FIG. 11C

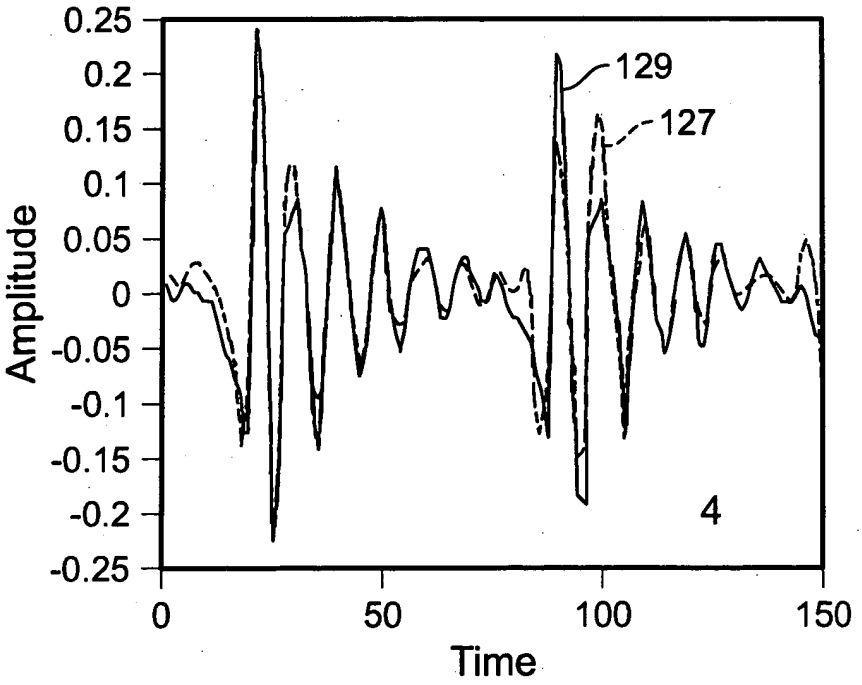

FIG. 11D

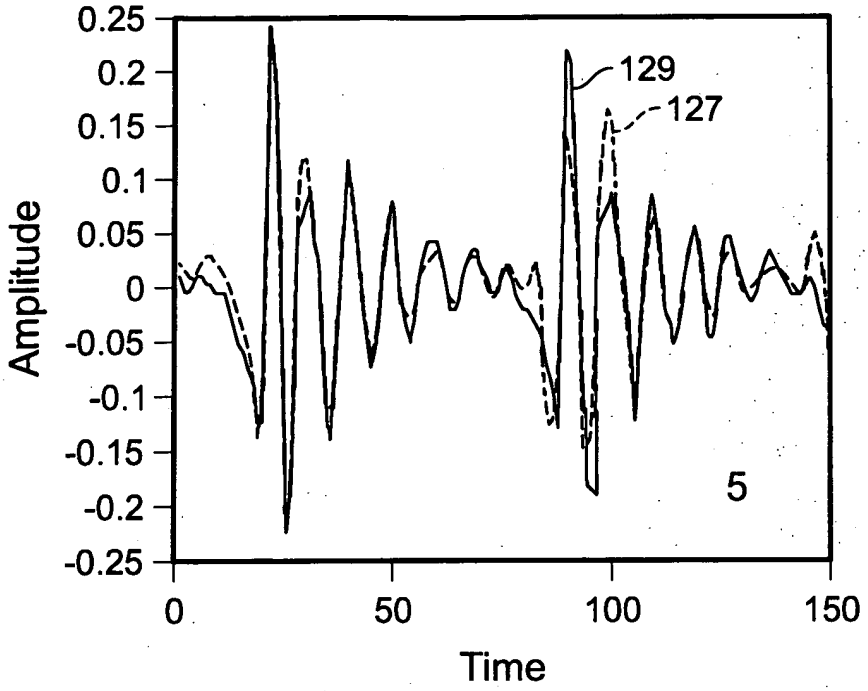

FIG. 11E

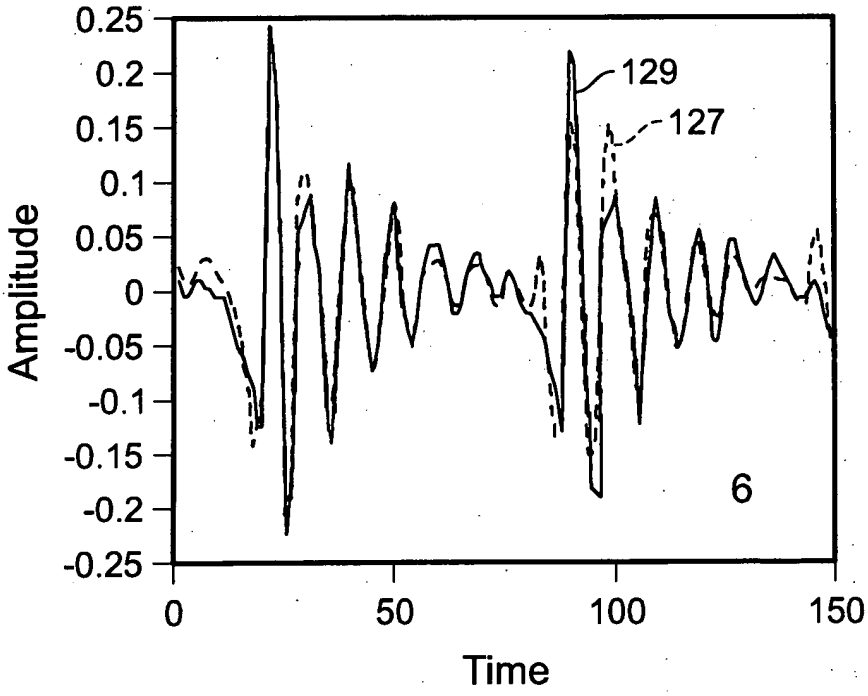

FIG. 11F

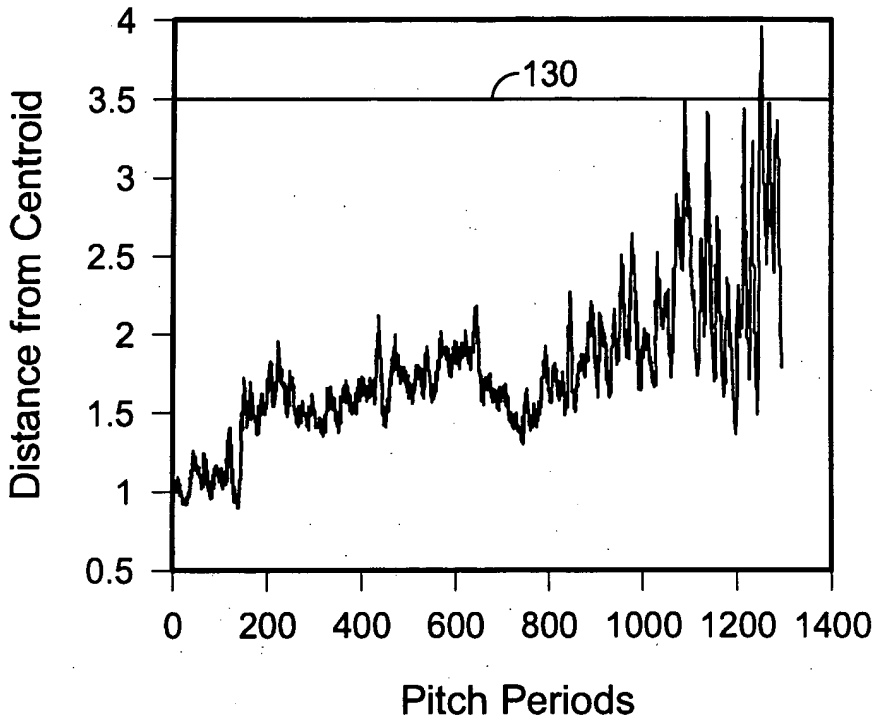
4
3.5
3
2.5
2
1.5
1
0.5
130
Distance from Centroid
0
200
400
600
800
1000
1200
1400
Pitch Periods

FIG. 12

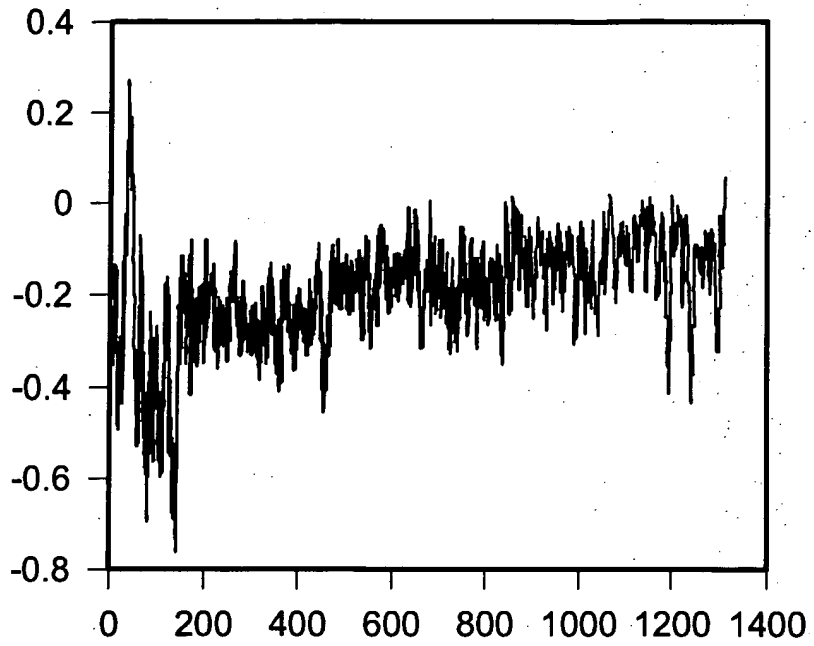

FIG. 13A

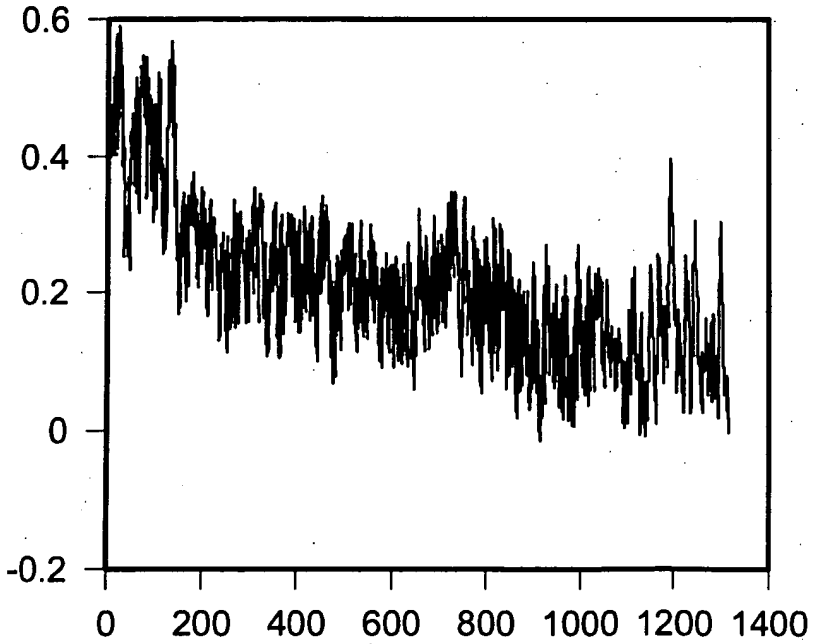

FIG. 13B

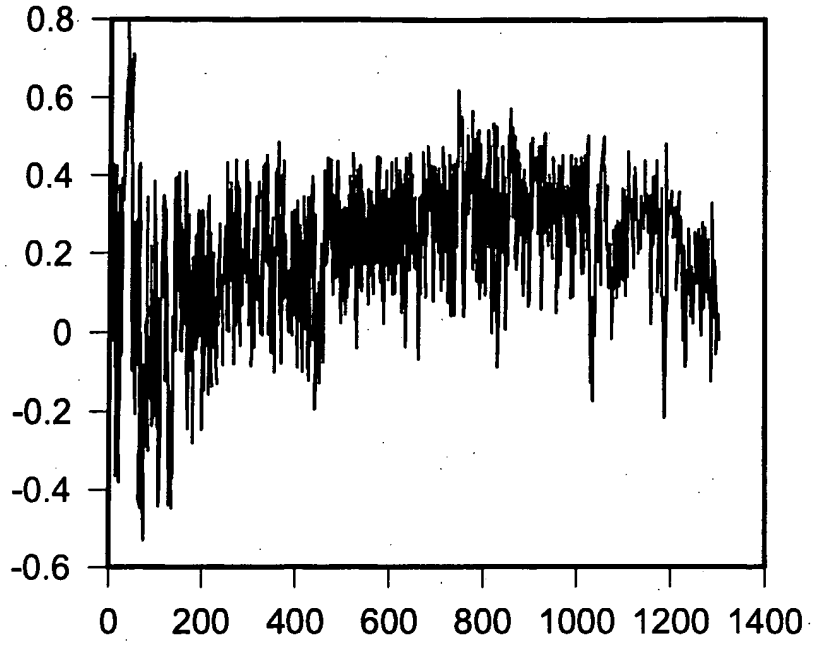

FIG. 13C

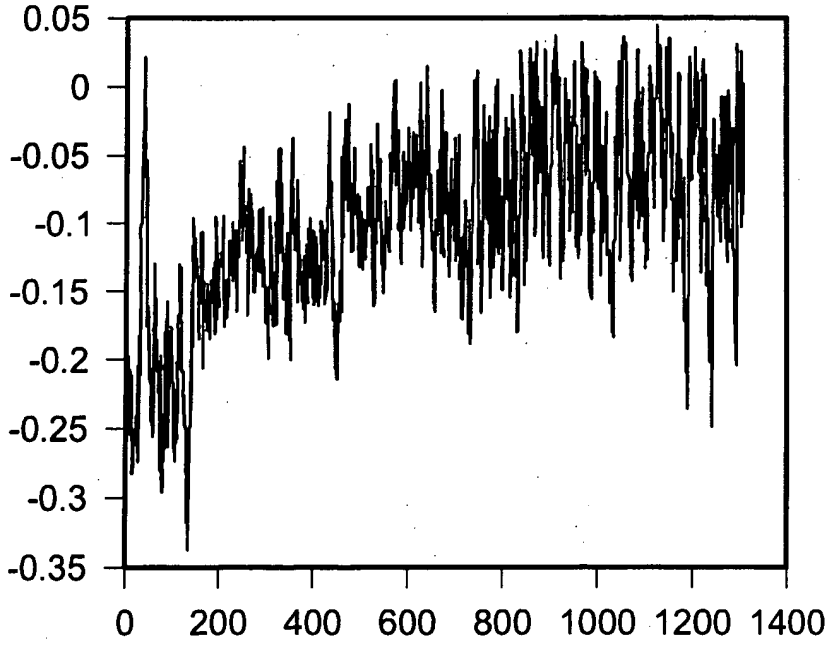

FIG. 13D

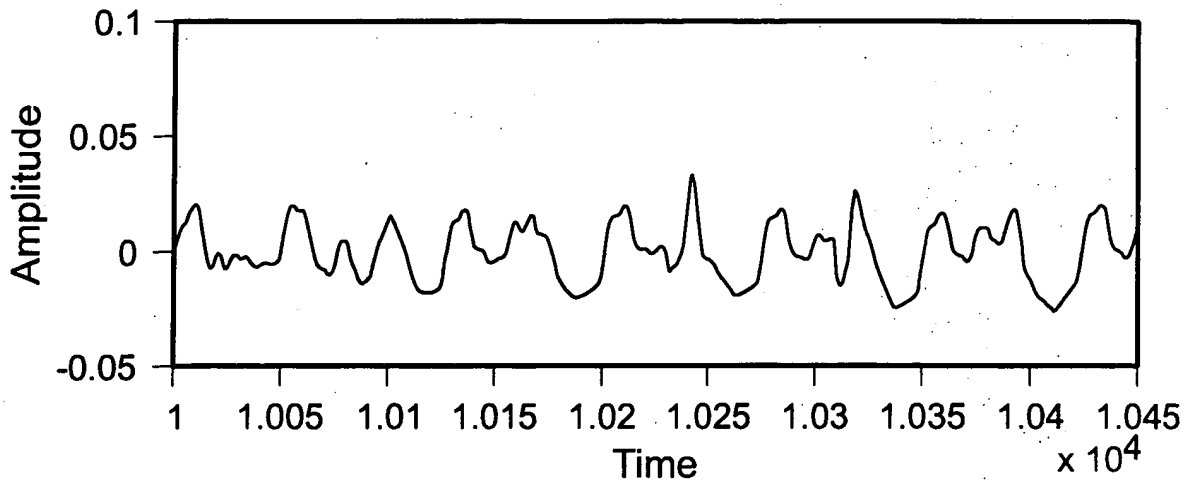

FIG. 14A

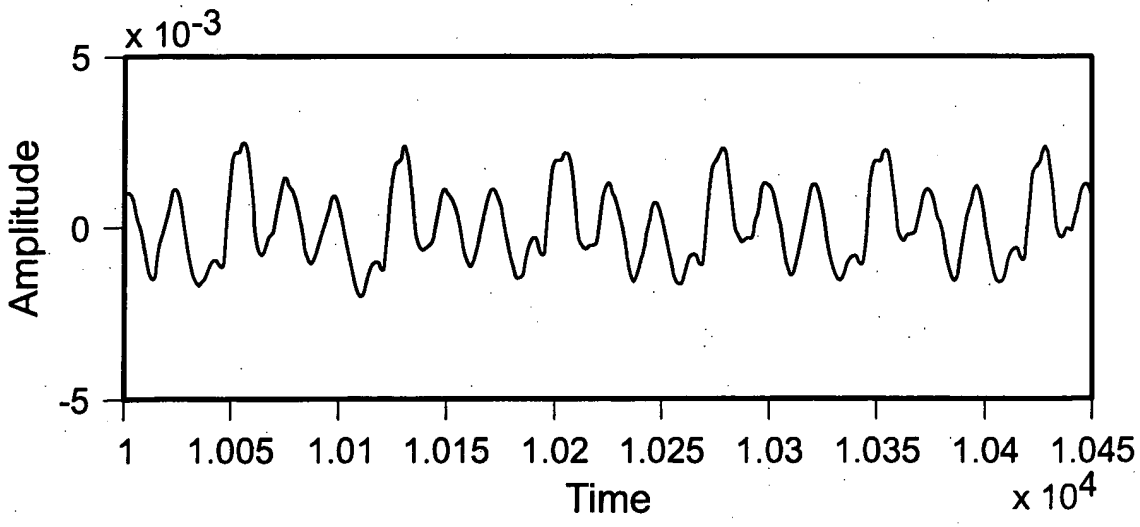

FIG. 14B

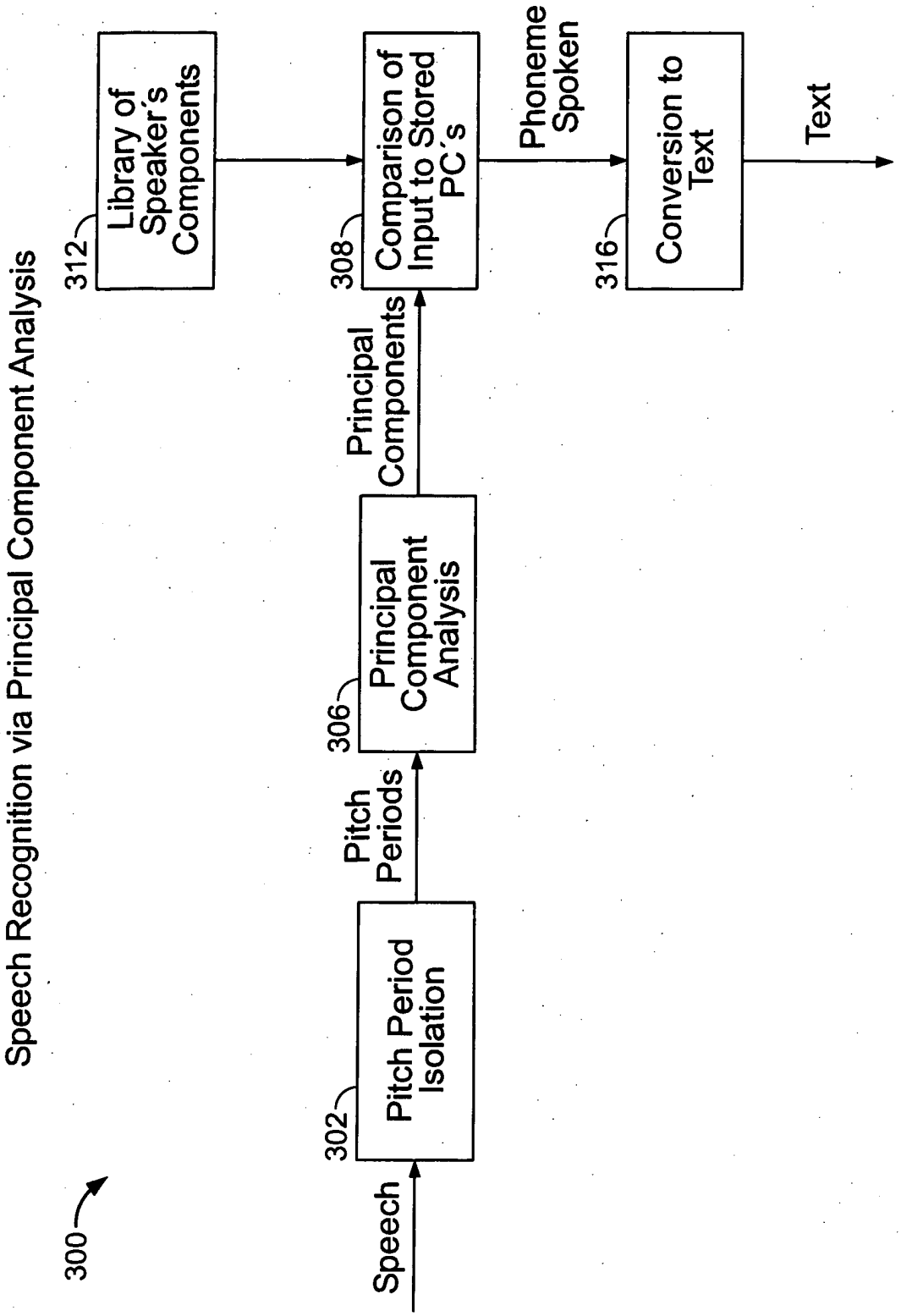
Speech Recognition via Principal Component Analysis
300
Speech
302
Pitch Period Isolation
Pitch Periods
306
Principal Component Analysis
Principal Components
308
Comparison of Input to Stored PC's
312
Library of Speaker's Components
Phoneme Spoken
316
Conversion to Text
Text

FIG. 15

Speech Synthesis via Principal Component Analysis

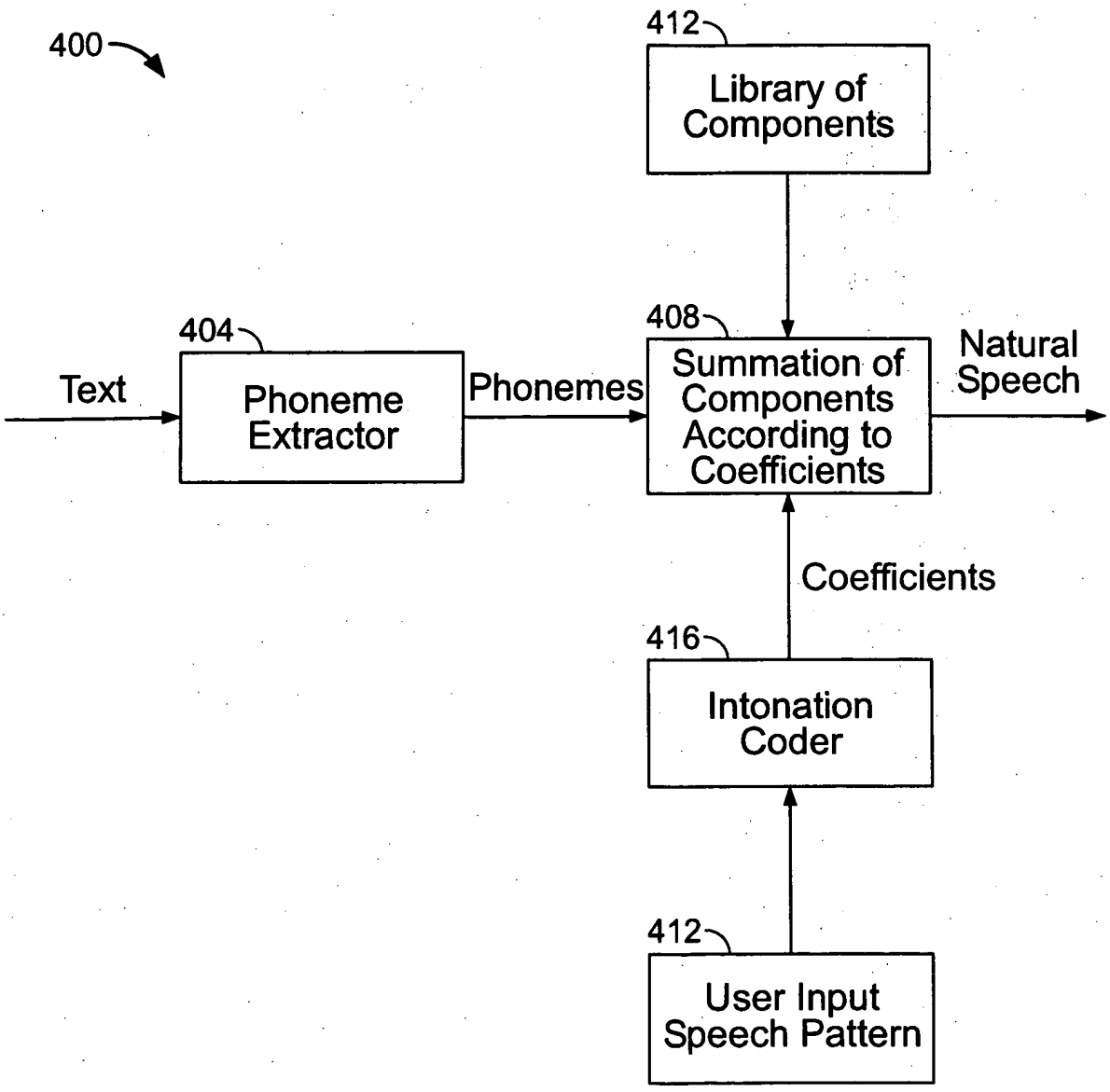

FIG. 16

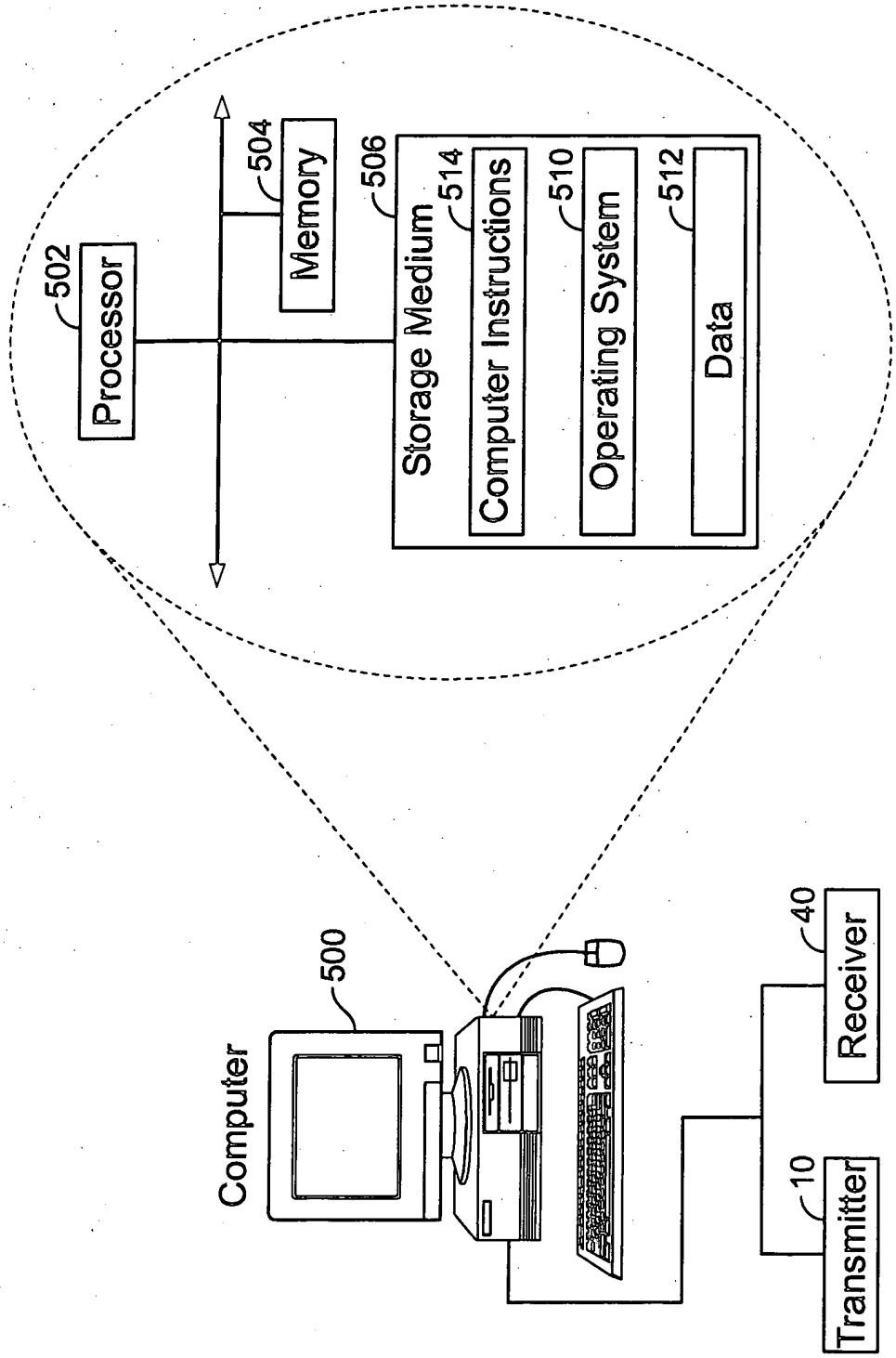
Computer
500
Processor
502
Memory
504
Storage Medium
506
Computer Instructions
514
Operating System
510
Data
512
Receiver
40
Transmitter
10

FIG. 17